

Patent Claims

1. Method for applying manganese phosphate layers to iron
or steel surfaces using phosphating solutions
5 containing manganese, phosphate or iron(II) ions as
well as nitroguanidine, characterised in that in order
to form a manganese phosphate layer having a minimum
thickness of 2 μm and an averaged maximum roughness
depth (R_z) of 2.5 μm measured after drying, the
10 workpieces are brought into contact with a phosphating
solution containing
 - 0.2 to 4 g/l of iron(II) ions
 - 10 to 25 g/l of manganese ions
 - 15 25 to 50 g/l of phosphate ions (calc. as P_2O_5)
 - 3 to 35 g/l of nitrate ions
 - 0.5 to 5 g/l of nitroguanidine
- that has 7 to 24 points of free acid, 50 to 140 points
20 of total acid, as well as an S value of 0.2 to 1.
2. Method according to claim 1, characterised in that the
workpieces are brought into contact with a phosphating
solution that contains 0.5 to 2 g/l of nitroguanidine.
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3. Method according to claim 1 or 2, characterised in
that the workpieces are brought into contact with a
phosphating solution, that contains at most 2.5 g/l of
30 iron(II) ions.
4. Method according to claim 1, 2 or 3, characterised in
that the workpieces are brought into contact with a
phosphating solution, that in the case of the
35 treatment of steel, contains a complex-forming agent

for the alloying constituents of the steel, preferably citric acid.

5. Method according to one or more of claims 1 to 4,
5. . . characterised in that the workpieces are brought into
contact with a phosphating solution that additionally
contains
0.2 to 4 g/l of nickel ions
or
10 0.2 to 4 g/l of magnesium ions.
6. Method according to one or more of claims 1 to 5,
characterised in that the workpieces are brought into
contact with a phosphating solution in which a
15 proportion of the manganese ions are replaced by
manganese carbonate in order to neutralise the free
acid.
7. Use of the method according to one or more of claims 1
20 to 6 for workpieces that are subjected to a sliding
friction, such as axles, gear mechanism parts and
engine pistons.